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REMARKS

Claims 1-8, 10, and 13-17 are now pending in the application. Of these claims, claims 1, 3, 5, 6, 10, and 13-16 have been amended. Claims 9, 11, 12, and 18-31 have been cancelled. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 112

Claims 1-17 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

Claim 1 is rejected because "it" lacks a clear antecedent. Claim 1 has been amended to replace "it" with terms that have a clear antecedent.

Claims 3, 5, and 6 are rejected because "around room temperature" is indefinite. Claims 3, 5, and 6 have been amended to delete "around".

Therefore, reconsideration and withdrawal of this rejection is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Croat (U.S. Pat. No. 4,851,058). This rejection is respectfully traversed.

The Examiner alleges that Croat teaches a method of making a magnetic material having a composition that overlaps the alloy composition recited in the claims and that Croat's method comprises colliding a molten alloy to a circumferential surface of a cooling roll so as to cool and solidify it. Furthermore, the Examiner alleges that although Croat does not teach the presence of

dimple correcting means, one skilled in the art would have considered the claimed invention to be obvious because it is well settled that where the prior art teaches the process sought to be patented, a difference in structure of the apparatus used to carry out the process, or any of its steps, cannot be considered as a patentable limitation.

Applicants respectfully assert, however, that Croat contains no suggestion or motivation to utilize a method for manufacturing a ribbon-shaped magnetic material that comprises a step of dividing dimples that are produced on a roll contact surface of the ribbon-shaped magnetic material which is in contact with the circumferential surface of the cooling roll with the dimple correcting means, wherein the dimple correcting means are defined by at least one ridge that is formed by grooves in the circumferential surface of the cooling roll. Furthermore, Croat contains no suggestion or motivation to utilize a method that includes preventing the molten alloy from entering the grooves of cooling roll.

The claimed grooves expel gas entered between the circumferential surface and a puddle of the molten alloy. Expelling the gas between the cooling roll surface and puddle of the molten alloy enables reliable contact between the molten alloy and circumferential surface of the cooling roll. Such reliable contact provides uniform cooling of the molten alloy and prevents dimples from forming in the cooled alloy which may cause a magnet to be produced with insufficient magnetic properties. As Croat contains no suggestion or motivation to utilize such a method, the claimed method is not obvious.

Claims 1-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukuno et al (U.S. Pat. No. 5,665,177). This rejection is respectfully traversed.

The Examiner alleges that Fukuno et al teaches a method of making rare-earth-iron-boron permanent alloy powder by ejecting a melt of the alloy against a cooling roll, wherein the

cooling roll has grooves with a pitch of 100 to 700 •m to form a ribbon is ground to a particle size of 100 to 700 •m. The Examiner also alleges that the grooves have an average depth of 1 to 50 •m and that the roll in Fukuno's process is a base roll with an outer surface layer having a thermal conductivity that is less than that of the base roll and in which the grooves are formed.

However, as was stated above in the rebuttal of the rejection under Croat, Fukuno et al is also completely silent with respect to a method of manufacturing a ribbon-shaped magnetic material that includes dividing dimples that are produced on a roll contact surface of the ribbon-shaped magnetic material which is in contact with the circumferential surface of the cooling roll with dimple correcting means. The dimple correcting means are defined by at least one ridge that is formed by grooves in the circumferential surface of the cooling roll, wherein an average width of each groove is 0.5-90 μm for preventing the molten alloy from entering the grooves. The claimed grooves expel gas entered between the circumferential surface and a puddle of the molten alloy. This width also prevents the molten alloy from entering into the groove. Expelling the gas enables reliable contact between the molten alloy and circumferential surface of the cooling roll. Such reliable contact provides uniform cooling of the molten alloy and prevents dimples from forming in the cooled alloy which may cause a magnet to be produced with insufficient magnetic properties.

In contrast, Fukuno et al in column 5, lines 56-67, teaches that the molten alloy should enter the grooves. "The grooves extend circumferentially in the circumferential surface thereof. The distance Di between two adjacent ones of the grooves at least in a region with which the molten alloy comes in contact is 100 to 300 μm on average in an arbitrary cross section containing an axis of the chill roll (as shown in FIG. 1, the distance between two adjacent grooves is measured with respect to corresponding portions of the adjacent grooves). If the

average distance Di is less than the range, the molten alloy enters the groove with difficulty so that the molten alloy might not be uniformly cooled, and the roll becomes less effective for controlling a variation of cooling rate." (emphasis added) By teaching that the molten alloy should enter the grooves, Fukuno et al directly teaches away from the claimed method, and therefore, the claimed method is not obvious. As such, reconsideration and withdrawal of this rejection is respectfully requested.

DOUBLE-PATENTING

Claims 1 to 17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 to 18 of copending Application No. 09/833,805.

Applicant elects to defer the filing of a terminal disclaimer until the Examiner has considered the claims, as amended.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: Dec 6, 2002

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ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and strike-throughs indicate deletions.

1. (Amended) A magnetic material manufacturing method for manufacturing a ribbon-shaped magnetic material ~~by~~ comprising:

colliding a molten alloy to a circumferential surface of the cooling roll so as to cool and then solidify ~~it~~ the molten alloy, wherein the ribbon-shaped magnetic material ~~having~~ has an alloy composition represented by the formula of $R_x(Fe_{1-y}Co_y)_{100-x-z}B_z$ (where R is at least one rare earth element, x is 10-15 at%, y is 0-0.30 and z is 4-10 at%)~~,~~;

~~wherein the circumferential surface of the cooling roll has dimple correcting means for~~

dividing dimples ~~to be~~ that are produced on a roll contact surface of the ribbon-shaped magnetic material which is in contact with the circumferential surface of the cooling roll with dimple correcting means, the dimple correcting means are defined by at least one ridge that is formed by grooves in the circumferential surface of the cooling roll, wherein an average width of each groove is 0.5-90 μm for preventing the molten alloy from entering the grooves.

3. (Amended) The manufacturing method as claimed in claim 1, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity lower than the heat conductivity of the structural material of the roll base at ~~or around a~~ room temperature.

5. (Amended) The manufacturing method as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a heat conductivity equal to or less than 80 $Wm^{-1}K^{-1}$ at ~~or around a~~ room temperature.

6. (Amended) The manufacturing method as claimed in claim 2, wherein the outer surface layer of the cooling roll is formed of a material having a coefficient of thermal expansion in the range of 3.5 – 18 [$x10^{-6}K^{-1}$] at ~~or around a~~ room temperature.

10. (Amended) The manufacturing method as claimed in claim ~~9~~ 1, wherein the average width of the ridge is 0.5-90 μm.

13. (Amended) The manufacturing method as claimed in claim ~~11~~ 1, wherein the average height of the ridge or the average depth of the groove is 0.5-20 μm.

14. (Amended) The manufacturing method as claimed in claim ~~11~~ 1, wherein the ridge or groove is formed spirally with respect to the rotation axis of the cooling roll.

15. (Amended) The manufacturing method as claimed in claim ~~11~~ 1, wherein the at least one ridge or groove includes a plurality of ridges or grooves which are arranged in parallel with each other through an average pitch of 0.5-100 μm.

16. (Amended) The manufacturing method as claimed in claim ~~11~~ 1, wherein the ratio of the projected area of the ridge or groove with respect to the projected area of the circumferential surface is equal to or greater than 10%.